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IV. "On the Chemical Constitution of Reichenbach's Creosote."—
Preliminary Notice. By HUGO MÜLLER, Ph.D. Communicated
by WARREN DE LA RUE, F.R.S. Received October 1, 1864.

This substance, which has been discovered by Reichenbach amongst the products of destructive distillation of wood, has been repeatedly the subject of chemical investigation, but owing to the difficulty attending its purification, the chemical nature of creosote remained doubtful until 1858, when Hlasiwetz published his elaborate research on this subject.

Up to that time Reichenbach's creosote was frequently confounded with phenol (phenyl alcohol, carbolic acid); and, indeed, the latter had very nearly supplanted the true creosote in its application. Hlasiwetz first prepared the creosote in a chemically pure state, and ascertained its chemical formula to be $C_8 H_{10} O_2$, and showed that this substance, although having some characteristic properties in common with phenol, was a distinct chemical substance, and otherwise in no way related to this body.

At the time of publication of Hlasiwetz's memoir I was myself engaged with the investigation of creosote prepared from wood-tar; and such results as I had then arrived at completely coincided with those obtained by Hlasiwetz.

Having a considerable quantity of pure material at my disposal, I took up this subject again, with the view of obtaining some insight into the chemical constitution of creosote, and I think I am now able to lay before the Society a few results which may serve as a contribution towards the solution of the questions at issue.

I will reserve a full description of my experiments for a future occasion, and confine myself in this communication merely to the description of one reaction, which I consider best calculated to illustrate the results I have obtained.

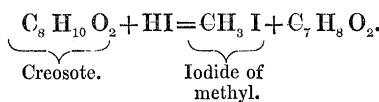
When pure creosote, boiling constantly (in hydrogen) at $219^{\circ} C.$, is brought into contact with concentrated hydriodic acid and heated to boiling, it is acted upon, iodine is set free, and iodide of methyl distils over. As the free iodine interferes with the result of the reaction, I varied the experiment by substituting iodide of phosphorus for hydriodic acid, in the following manner: the creosote is shaken up with a small quantity of water, of which it dissolves a certain portion, then ordinary phosphorus is introduced, and the whole gently warmed. The iodine is now added in small quantities at a time, care being taken that there is always an excess of phosphorus after the iodine has been converted into iodide of phosphorus. If the temperature is now gradually raised to about $95^{\circ} C.$, the reaction makes itself manifest by the evolution of vapour of iodide of methyl, which distils over, and which is condensed in an ice refrigerator. As soon as the reaction diminishes, fresh portions of phosphorus and iodine are added, and the experiment so continued until the substance in the retort becomes gradually thicker and thicker, and viscid if allowed to cool.

The distillate collected in the receiver consists mainly of iodide of methyl mixed with some unaltered creosote, from which it is readily liberated by distillation, and agitation with a solution of caustic alkali.

The residue contained in the retort, on being mixed with water, now readily dissolves, with the exception of a small quantity of a heavy brown oil which contains unaltered creosote. The aqueous solution is mixed with a large quantity of water and partly saturated with carbonate of barium, the clear liquid filtered off and precipitated with acetate of lead, the white precipitate well washed and decomposed with sulphuretted hydrogen. The sulphide of lead having been filtered off, the aqueous solution is now carefully evaporated at a low temperature, when a thick heavy liquid is obtained, which in its reactions so closely resembles pyrocatechine or oxyphenic acid, that one would be inclined to consider it identical with this substance if it were not for the apparent impossibility of obtaining it in a crystalline form.

I am still engaged with the determination of the composition of the latter substance; but, from its chemical nature, so far as I have made myself acquainted with it, and from other considerations, I think it more than probable that this substance bears the closest analogy to oxyphenic acid ($C_6 H_6 O_2$), and is in all probability its homologue.

The described decomposition of creosote may be expressed in the following way:—



According to which creosote may be considered as methylated oxytolyllic acid, or oxykressylic acid.

This view gains in probability if we consider the general properties of creosote, and the fact that a lower homologue of creosote, together with free oxyphenic acid, exists amongst the products of distillation of wood. Hlasivetz has moreover shown that guaiacol is identical with this lower homologue of creosote, which it resembles in every respect.

If the constitution of creosote ($C_8 H_{10} O_2$) turns out to be as stated above, guaiacol ($C_7 H_8 O_2$) may be regarded as methylated oxyphenic acid, and we may therefore expect to obtain by the action of hydriodic acid upon this substance, iodide of methyl and oxyphenic acid.

I am about to carry out the latter experiment.

V. "Researches on the Colouring Matters derived from Coal-tar.—

No. IV. Phenyltolylamine." By A. W. HOFMANN, LL.D., F.R.S. Received October 19, 1864.

The discovery of diphenylamine among the products of decomposition furnished by the destructive distillation of aniline-blue (triphenyllic ros-